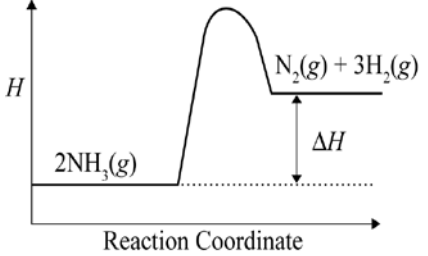


Endothermic and Exothermic reactions

QUESTION: Classify the following reactions as endothermic or exothermic

Reactions	Endothermic or Exothermic reaction
ice \rightarrow water	
$2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$	
$\text{NH}_4\text{NO}_3(\text{s}) \rightarrow \text{NH}_4^+(\text{aq}) + \text{NO}_3^-(\text{aq}) \quad \Delta_r H = +25.7 \text{ kJ mol}^{-1}$	
water vapour condensing	
$\text{C}_2\text{H}_4(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightarrow \text{C}_2\text{H}_5\text{OH}(\text{g}) \quad \Delta_r H = -48.0 \text{ kJ mol}^{-1}$	
$\text{H}_2\text{O}(\text{g}) \rightarrow \text{H}_2\text{O}(\ell)$	
$\text{CH}_4(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightarrow \text{CO}(\text{g}) + 3\text{H}_2(\text{g})$ 206kJ of energy is absorbed	
When zinc powder reacts with copper sulfate solution, the temperature rises.	
$\text{NaOH}(\text{aq}) + \text{HCl}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{H}_2\text{O}$ A temperature increase occurs.	
$\text{N}_2(\text{g}) + 2\text{N}(\text{g}) \quad \Delta_r H = +934 \text{ kJ mol}^{-1}$	
$\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$ A temperature decrease occurs.	
$2\text{H}_2(\text{g}) + \text{CO}(\text{g}) \rightleftharpoons \text{CH}_3\text{OH}(\text{g}) \quad \Delta_r H = -128 \text{ kJ mol}^{-1}$	
$\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) \quad \Delta_r H = -393 \text{ kJ mol}^{-1}$	
Formation of snow from water vapour.	

	
<p>When magnesium is added to hydrochloric acid a reaction occurs and the temperature of the reaction mixture increases.</p>	
$\text{H}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g}) \rightarrow \text{H}_2\text{O}(\text{g}) \quad \Delta_r H = -286 \text{ kJ mol}^{-1}$	
<p>Photosynthesis – food-making process in plants</p>	
<p>Freezing of water</p>	
<p>Dissolving sodium hydroxide in water (the temperature increases)</p>	